Enhancing NASA's Procedure Representation Language to Support Planning Operations, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Automation and autonomy are key elements in realizing the vision for space exploration. The NASA Exploration Technology Development Program (ETDP) has been developing a procedure representation language (PRL) that both captures the form of traditional procedures and allows for automatic translation into code that can be executed by NASA-developed autonomous executives. However, PRL is in a relative infancy with regard to supporting many of the autonomous software components being developed by NASA, specifically automated planners and schedulers. In this proposal we will design and test additional representations to PRL for resources, inter-procedure constraints and subprocedures so that automated planners can take better advantage of the PRL-generated procedures. The work plan includes developing scenarios and use cases, developing requirements for planning -- both manual and automated -- from the scenarios, developing XML tags for the PRL changes, testing the PRL enhancements in the use cases with robotic and life support simulations, and translating the changes into planning languages with proven semantics.

Anticipated Benefits

The military is currently a large customer for unmanned vehicle operations. Unmanned vehicles, both air and ground, are becoming more and more common in battlefield situations. Future Combat Systems (FCS) envision manned and unmanned vehicles of all sizes working side-by-side. In addition, Congress has mandated that one-third of all military vehicles must be unmanned by 2015. As these unmanned vehicles are increasingly deployed in tandem with dismounted forces coordinating software will be necessary to ensure successful operations. Procedures and mission planning play a large role in these kinds of operations. TRACLabs Inc. has an existing relationship with the Army's unmanned ground vehicle center at the TARDEC (Tank-Automotive Research, Development and Engineering Center) facility in Warren Michigan. The Army has established a new Joint Center for Unmanned Ground Vehicles (JC-UGV) at TARDEC with a new Systems Integration Laboratory (SIL).

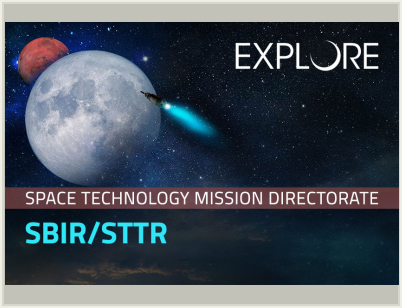

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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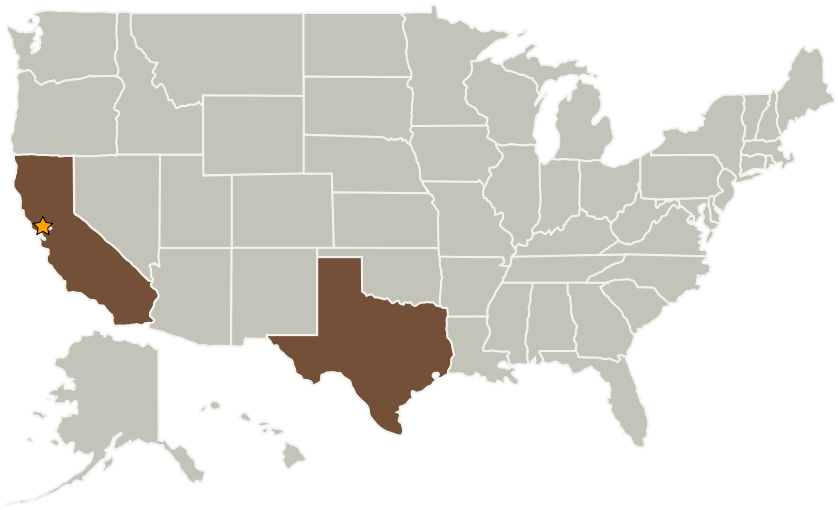
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
TRACLabs, Inc.	Supporting Organization	Industry	Webster, Texas

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Project Manager:
Jeremy D Frank

Principal Investigator:
Russell P Bonasso

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.2 Prevention and Countermeasures